

The Applicant suggests that the prior art rejections are improper and should be withdrawn.

**Rejections under 35 U.S.C. § 102**

I. The Office Action rejected Claims 1, 12-14, 16, 17, 23, 24, 34 and 35 are rejected as being anticipated by Yang. Applicant asserts that Yang does not disclose each and every element as required under §102.

Claim 1, reproduced for the examiner's convenience, recites:

A system for providing oscillator control throughout a first operating range, said system comprising:

a controllable oscillator;

a phase lock loop circuit coupled to said controllable oscillator, wherein said phase lock loop circuit has a second operating range, wherein said second operating range is selected independent of a desired width of said first operating range to provide an acceptable level of operational characteristics; and

a control circuit coupled to said controllable oscillator, wherein said control circuit provides a control signal to said controllable oscillator to selectively adjust said second operating range to correspond to a desired portion of said first operating range. (emphasis added)

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Adjust PLL to  
range of VCO

Yang discloses a frequency control apparatus where the frequency value of a voltage controlled oscillator is increased or decrease based on whether an oscillator is in a range capable of operating a phase lock loop. The disclosure of Yang describes operating the oscillator until the oscillator frequency is within the controllable range of the PLL.

In regards to independent claim 1, the Examiner states that “Yang discloses... a control circuit for adjusting the operating range of the oscillator to a range capable of operating the PLL.” However, the present invention as described by claim 1 “provides a control signal ... to selectively adjust said second operating range to correspond to a desired portion of said first operating range” where the second operating range is associated with the phase lock loop circuit. In short the present invention as described by claim 1 adjusts the range of the PLL in order to provide oscillator control, Yang on the other hand adjusts the oscillator to bring it within the control range of the PLL.

Yang does not disclose, teach or suggest adjusting the operating range of the PLL, as such Yang cannot anticipate the present invention as described by independent claim 1. Therefore the Applicant submits the rejection is improper and should be withdrawn. Likewise as claims 12-14, 16, 17 and 23 depend from claim 1, their rejection is improper irrespective of the additional patentable features recited therein, and thus these rejections should also be withdrawn.

In regards to independent claim 24, the Examiner incorrectly equates adjusting the oscillator frequency with adjusting the PLL range. The Examiner states that “The sweep mode provides control signals to adjust the operating range of the oscillator”, which the Applicant contends is in complete contradiction to the language of claim 24 which recites “adjustment of said first range of frequencies causes said first range of frequencies to

correspond to a different portion of said second range of frequencies without broadening said first range of frequencies.”

The Applicant submits, in view of the above, that Yang does not show, teach or suggest each of the features recited in claim 24, and thus the rejection is improper and should be withdrawn. Likewise, as claims 34 and 35 depend from claim 24, their rejection is improper irrespective of the additional patentable features recited therein, and thus these rejections should also be withdrawn.

II. The Office Action rejected claims 53 and 61 as being anticipated by Tomesen et al. The Applicant asserts that the cited art does not disclose the features of claims 53 and 61.

The Office Action states that “Tomesen discloses...providing a sweep mode to step operation of PLL over a range of frequencies, and monitoring the sweep mode to determine the range of frequencies able to successfully maintain frequency lock” and cites column 5, lines 55-67 as a basis.

Claim 53 recites:

A method of providing automatic frequency compensation comprising the steps of:

providing a phase lock loop mode of operation to maintain frequency lock over a selected first range of frequency drift;

**providing a sweep mode of operation to step operation of said phase lock loop first range of frequency drift over a selected second range of frequency drift; and**

monitoring at least one of said phase lock loop mode of operation and said sweep mode of operation to determine a portion of said second range of frequency drift said first range is successfully able to maintain said frequency lock. (emphasis added)

Tomesen is directed to among other things a synthesized PLL that can be switched from one mode to another mode, where in one mode the PLL is incremented with small step widths and low loop bandwidth and in another mode the PLL is incremented with large step widths and wide loop bandwidth. A moveable frequency range for the PLL is not disclosed or envisioned by Tomesen.

The Examiner has used mode 1 and mode 2 to describe how Tomesen meets the claim limitations, however, Tomesen in Column 6, lines 32-34 explicitly states that “Automatic frequency control, ..., is not done by the tuner PLL, but by the digital AFC (de-rotating) circuit in the carrier recovery loop.”(emphasis added)

The Applicant refers the examiner to column 5 lines 55-67 of Tomesen. Tomesen states “operating the synthesizer in mode 2[, ] a frequency sweep around the expected frequency is started. An optimum lock position will be detected and the divider ratio of this point is stored in a memory.” Further, Tomesen states “Mode 2 is made slow to allow in-lock steps of the tuner” (col. 5 ll. 47-49), therefore over the entire frequency

range (second range) a tuner lock is available. This is in contrast to determining which portion of the second range, the first range is successfully able to maintain a frequency lock described by claim 53.

Tomesen simply, while directed to, *inter alia*, a PLL, does not show, teach or suggest the method as described in the present invention and in particular the method described by claim 53. Therefore the rejection is improper and should be withdrawn. Likewise as claim 61 depends from claim 53, the rejection should be withdrawn irrespective of the additional patentable features contained therein.

### **Rejections under 35 U.S. C. §103**

I. The Office Action rejected Claims 3 and 9 as being unpatentable over Yang in view of Bogdan.

The Examiner suggests that Yang discloses all of the elements as described in reference to claim 1, but does not specify the use of a digital phase lock loop. While Applicant agree that Yang does not disclose a digital phase lock loop, Applicant has clearly shown above that Yang does not disclose all of the features of Claim 1.

The Examiner uses Bogdan to obviate the Digital Phase Lock Loop deficiency of Yang, however the addition of Bogdan does little to obviate the other deficiencies evident in Yang with regards to Independent Claim 1. As noted above, Yang does not

“selectively adjust the second operating range to correspond to a desired portion of the first operating range” as described in Claim 1.

Yang and Bogdan taken alone or in combination fail to disclose, teach or suggest the features described in Claim 1, and thus Claims 3 and 9. Therefore the rejections of Claims 3 and 9 are improper and should be withdrawn.

II. The Office Action rejected Claim 4 as being unpatentable over Yang in view of Bogdan as applied to Claim 3 and further in view of Adams et al.

The Examiner acknowledges that Yang and Bogdan do not specify a type of DAC to be used and attempts to use Adams<sup>2</sup> to correct this deficiency. Adams is directed to variable sample-rate DAC/ADC converter systems. The disclosure of Adams does little to correct the deficiencies enumerated earlier in regards to Claim 1 from which Claim 4 depends. Therefore, regardless of whether Adams discloses a type of DAC, Yang, Bogdan and Adams, taken alone or combination do not show, teach or suggest the invention as described in Claim 4. The Applicant requests withdrawal of the rejection.

III. The Office Action rejected Claim 10 as being unpatentable over Yang in view of Bogdan as applied to claim 9 above, and further in view of Shohara.

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<sup>2</sup> Applicant points out that Adams does not teach or suggest the use of a sigma-delta converter, but rather discloses that “oversampling converters, such as sigma delta converters, are well known in the art. Such benefits [of oversampling] include freedom from distortion at low signal levels, linear phase anti-alias filtering, and compatibility with CMOS processes.”

The Examiner acknowledges that Yang and Bogdan do not disclose , teach or suggest the use of hysteresis control and attempts to use Shohara<sup>3</sup> to correct this deficiency. However the disclosure of Shohara does not obviate the deficiencies of Yang and Bogdan enumerated earlier in regard to Claim 9, from which Claim 10 depends. Therefore, regardless of whether Shohara discloses the use of a hysteresis control, Yang and Bogdan, taken alone or in combination do not show, teach or suggest the invention as described in Claim 10. The Applicant requests withdrawal of the rejection.

IV. The Office Action rejected Claims 18-20 and 22 as being unpatentable over Yang in view of Tomesen.

The Examiner acknowledges that Yang does not disclose , teach or suggest scanning a contiguous portion of the frequency range in order to synchronize frequencies and attempts to use Tomesen<sup>4</sup> to correct this deficiency. However the disclosure of Tomesen does not obviate the deficiencies of Yang enumerated earlier in regard to Claim 1, from which Claim 22 depends and from which Claims 18-20 ultimately depend. Furthermore, Applicant disagrees with Examiner in regard to Claim 22 that it is well known in the art to choose an operating range to accommodate frequency drift associated with the life of the system. Nowhere in any of the cited prior art do any of the disclosures

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3 Applicant points out that Shohara discloses a hysteresis "range" wherein no adjustment of the VCXO occurs (Col. 18 ll. 60). The present claim recites a hysteresis "control" used to adjust the range of the phase lock loop in order to make adjustments to the VCXO.

4 Applicant points out in regard to Claim 20, that Tomesen does not teach, or suggest using the optimum lock position stored in memory for anything more than a starting point when the signal is lost.

show, teach, or suggest selecting a first frequency range dependent on the operational drift associated with an extended system operational life. Therefore, regardless of whether Tomesen discloses scanning a contiguous portion of the frequency range, Yang and Tomesen, taken alone or in combination do not show, teach or suggest the invention as described in claim 18-20 and 22. The Applicant requests withdrawal of the rejection.

V. The Office Action rejected Claims 25 as being unpatentable over Yang in view of Adams and Bogdan.

The Examiner acknowledges that Yang does not disclose the use of a digital PLL or a high resolution DAC and attempts to use Bogdan and Adams, respectively, to correct these deficiencies. The disclosure of Bogdan and Adams does nothing to correct the deficiencies enumerated earlier in regards to Claim 24 from which Claim 25 depends. Therefore, regardless of whether Bogdan discloses the use of a digital PLL, and whether Adams discloses the use of a high resolution DAC, Yang, Bogdan, and Adams taken alone or in combination do not show, teach, or suggest the invention as described in Claim 25. The Applicant requests withdrawal of the rejection.

VI. The Office Action rejected Claims 45 and 48-50 as being unpatentable over Fukui in view of Bogdan and Adams.

Applicant disagrees with the Examiner's assertion that Fukui discloses all the elements of Claim 45 except for: 1) a digital phase locked loop in which Examiner cites



Fukui in combination with Bogdan, and 2) a high resolution DAC in which Examiner cites Fukui in combination with Adams.

Fukui does not disclose a digital phase locked loop for controlling a voltage controlled oscillator. Rather, Fukui discloses a voltage controlled temperature compensated crystal oscillator that controls a phased lock loop. (fig. 1 and 8; col. 2 ll. 2-16). Applicant's Claim 45 reads "a digital phase lock loop circuit coupled to said digital to analogue converter to effectuate control of said voltage controlled oscillator."

Applicant submits that a VCO controlling a PLL is different than a PLL controlling a VCO. The Applicant requests withdrawal of the rejection to Claim 45.

Claims 48-50 depend on Claim 45. The Examiner acknowledges that Fukui does not disclose a digital phase locked loop or high resolution DAC and attempts to use Bogdan and Adams to correct this deficiency. The disclosure of Bogdan and Adams does nothing to correct the deficiencies enumerated earlier in regards to Claim 45 from which Claims 48-50 depend. Therefore, regardless of whether Bogdan discloses the use of a digital PLL, and whether Adams discloses the use of a high resolution DAC, Fukui, Bogdan, and Adams, taken alone or in combination do not show, teach or suggest the invention as described in claim 45. The Applicant requests withdrawal of the rejection to Claims 48-50.

VII. The Office Action rejected Claims 54 and 55 as being unpatentable over Tomesen.

Claims 54 and 55 depend from Claim 53 which as been proven above to be patentable over Tomesen. The Examiner asserts Claims 54 and 55 are rejected under 35 U.S.C. § 103(a) but fails to cite two different pieces of art to which Applicant can make a non-obviousness argument. Nevertheless, because Claim 53 is patentable, and Claims 54 and 55 depend from claim 53. Claims 54 and 55 should be found patentable without regard to the additional patentable limitations respectively recited therein. The Applicant requests withdrawal of the rejection to Claims 54 and 55.

## CONCLUSION

The Applicant requests reconsideration and allowance of Claims 1-61 in view of the above remarks.

As discussed in footnote 1, Applicant assumes, because Examiner does not address the objected Claims in the Office Action, that Claims 2, 5-8, 11, 15, 21, 26-33, 36-44, 46, 47, 51, 52, and 56-60 were objected to because of their dependence on rejected base claims. Withdrawal of the objections to the listed claims is requested in view of the above arguments that the rejections to the base claims be withdrawn.

Respectfully submitted,



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